

REMARKS

Applicant requests favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

To place the subject application in better form, the specification has been amended to correct minor informalities. Also, Applicant submits a new abstract in accordance with preferred practice. In addition, by separate paper, Applicant has amended the drawings, as requested by the Examiner. No new matter has been added by these changes.

Claims 1-4 are presented for consideration. Claim 1 is the sole independent claim. Claims 1-4 have been amended to clarify features of the invention. Support for these changes can be found in the original application, as filed. Therefore, no new matter has been added.

Applicant requests favorable reconsideration and withdrawal of the objection and rejection set forth in the above-noted Office Action.

Claim 1 was objected to due to an informality. Specifically, the Examiner asserted that the recited "picture display unit" did not have proper antecedent basis in this claim. To expedite prosecution, Applicant has amended claim 1 in light of the Examiner's comments. Applicant submits that this change overcomes the objection to claim 1. Such favorable indication is requested.

Turning now to the art rejection, claims 1-4 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,329,981 to Lin et al. Applicant submits that this patent does not teach many features of the present invention, as previously recited in claims 1-4. Therefore, this

rejection is respectfully traversed. Nevertheless, Applicant submits that claims 1-4, as presented, amplify the distinctions between the present invention and the cited art.

Independent claim 1 recites a picture display apparatus for displaying a picture in response to inputted picture signals of an arbitrary format. The apparatus includes a picture display unit having an arranged matrix of dots for picture display, picture display unit drive means for converting inputted picture signals into display picture signals adapted for display on the picture display unit and generating drive timing signals for driving the picture display unit, the picture display unit drive means including a picture memory for storing picture signals inputted into the picture memory, display position detection means for detecting a picture display position on the picture display unit based on the display picture signals and the drive timing signals, and display position control means for controlling a timing of admission of the inputted signals to the picture memory of the picture display unit drive means, based on the detected display position data from the display position detection means. The picture display unit, the picture display unit drive means, the display position detection means and the display position control means are integrated to form the picture display apparatus for receiving inputted picture signals of an arbitrary format.

Applicant submits that the cited art does not teach or suggest such features of the present invention, as recited in independent claim 1.

The Lin et al. patent relates to an apparatus for detecting the video mode of video data. The apparatus is capable of receiving a plurality of synchronous signals along with the transmission of the video data. The Lin et al. patent, in Figure 2, shows a display unit 310 and a

processing circuit 325. These elements may generally be considered to correspond to the picture display unit and the picture display unit drive means, respectively, of the present invention.

Also, the present invention is directed to a picture display apparatus, like a monitor for a computer, perhaps corresponding to a CRT 110 shown in Fig. 1A or display unit 310 shown in Fig. 2 of the Lin et al. patent. In the present invention, however, the data processing means is provided for receiving picture signals of an arbitrary format supplied from various signal sources, such as computers, for example. This is discussed in more detail in the subject application on page 1 at line 4 to page 2 at line 1. In addition, in the present invention, the picture display apparatus integrally includes, for example, picture display units having an arranged matrix of dots, a picture display unit drive means, including a picture memory, display position detection means and display position control means.

Applicant submits that the Lin et al. patent fails to teach or suggest a picture display apparatus (or unit) including, integrally, such a display unit 310 and a processing circuit 325, and being capable of receiving inputted picture signals of an arbitrary format from various picture signal supplying means. Rather, Applicant understands that the display unit 310 and the processing circuit 325 in the Lin et al. patent are connected with an enlarged arrow, which is believed to correspond to a cable 115 in the prior art device shown in Fig. 1A of that patent.

In more detail, the picture display unit drive means of the present invention is characterized by including therein a picture memory, which stores inputted picture signals admitted to the picture display unit drive means and combined with a display position control means for controlling a timing of admission of the inputted picture signals to the picture memory

based on detected display position data from the display position detection means, thereby ensuring responsiveness to inputted picture signals of an arbitrary format. Again, the Lin et al. patent completely fails to teach or suggest that the processing circuit 325 includes such a picture memory, in the manner of the present invention recited in independent claim 1. (2)

For the foregoing reasons, Applicant submit that the present invention, as recited in independent claim 1, is patentably defined over the cited art, whether that art is considered individually or in combination.

Dependent claims 2-4 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Regarding claim 2, which is directed to the picture memory, the Examiner at page 4 of the Office Action, refers to a memory 571 in Fig. 7E of the Lin et al. patent. Memory 571 in the Lin et al. patent, however, is used for storing differences in threshold values between the total lines/frame and active lines/frame and is completely different from the picture memory of the present invention, which is provided for storing inputted picture signals admitted under control by the display position control means. As a result of the arrangement noted above, particularly, by the control of writing timing in the picture memory, the picture display apparatus of the present invention allows the adjustment of vertical and horizontal writing initiation positions, even at a specified resolution. This is discussed in more detail beginning at page 12, line 1, of the subject specification with reference to Figs. 4 and 7. In contrast thereto, in view of Table 4 at column 13 of the Lin et al. patent, in that display apparatus, the display starting positions are believed to be automatically determined after fixing a specific resolution, which is

different from the arrangement in the present invention recited in claim 2. Further individual consideration of dependent claim 2, as well as dependent claims 3 and 4, is requested.

Applicant further submits that the instant application is in condition for allowance.

Favorable reconsideration, withdrawal of the objection and rejection set forth in the above-noted Office Action and an early Notice of Allowance are also requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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APPENDIX A

IN THE ABSTRACT

[Display position adjustment of a picture on a dot matrix-type picture display unit is automatically effected at a low current consumption and a low cost. This is accomplished by a picture display apparatus including such a picture display unit; picture display unit drive means for converting inputted picture signals into display picture signal adapted for display on the picture display unit and generating drive timing signals for driving the picture display unit; display position detection means for detecting a picture display position on the picture display unit based on the display picture signals and the drive timing signals; and display position control means for controlling admission of the inputted picture signals to the picture display unit drive means based on the detected display position data from the display position detection means.]

-- A picture display apparatus for displaying a picture in response to inputted picture signals of an arbitrary format. The apparatus includes a picture display unit having an arranged matrix of dots for picture display, a picture display unit drive for converting inputted picture signals into display picture signals adapted for display on the picture display unit and generating drive timing signals for driving the picture display unit, the picture display unit driver including a

picture memory for storing picture signals inputted into the picture memory, a display position detector for detecting a picture display position on the picture display unit based on the display picture signals and the drive timing signals, and a display position controller for controlling a timing of admission of the inputted picture signals to the picture memory of the picture display unit driver, based on the detected display position data from the display position detector. The picture display unit, the picture display unit driver, the display position detector and the display position controller are integrated to form the picture display apparatus for receiving the inputted picture signals of an arbitrary format. --

IN THE SPECIFICATION:

Please amend the specification as follows:

Please substitute the paragraph beginning at page 1, line 11, and ending on page 2, line 1, with the following.

-- In recent years, as picture display apparatus for computer apparatus, [etc.] for example, those of the so-called multiscan-type capable of displaying picture signals having various frequencies (or resolutions) have become popular. In this regard, picture signals inputted from the exterior are not always of a prescribed single format, but even picture signals having an identical resolution can have different horizontal or vertical initial or starting points of display on an entire display picture area or a display panel. This means that the deviation in starting point of a display can lead to a lack of picture display [picture] in the case of a dot matrix-type picture

display apparatus wherein a picture display region corresponds to a number of display pixels.

Accordingly, the picture display apparatus is required to have a means for displaying a picture at an exact position corresponding to an inputted picture signal. --

Please substitute the paragraph beginning at page 3, line 25, and ending on page 4, line 18, with the following.

-- The picture display apparatus of Figure 5 [unnecessitates] obviates the need for a manual adjustment for signal formats for which preset values have been set, but for signals of other formats, the operator is required to effect a troublesome manual adjustment of horizontal and vertical positions while observing a picture displayed on the display unit and the adjustment is also difficult. On the other hand, the picture display apparatus of Figure 6 allows an automatic positional alignment, but in view of higher resolution and higher input signal frequency adopted in recent years, the operation speed of the picture position detection circuit 6' is increased correspondingly to result in an increased current flow and a higher-speed expensive circuit device for realizing the picture position detection circuit 6', thus incurring an increased production and running cost. Particularly, in the case of effecting the picture position adjustment dot by dot, a substantial time is required for display position adjustment to cause a delay in commencement of display. --

Please substitute the paragraph beginning at page 6, line 5, with the following.

-- Figure 2 is a time chart for illustrating an example of a display position relative to a horizontal synchronizing signal. --

Please substitute the paragraph beginning at page 6, line 8, with the following.

-- Figure 3 is a time chart for illustrating an example of a display position relative to a vertical synchronizing signal. --

Please substitute the paragraph beginning at page 8, line 2, with the following.

-- Further, by adopting a system sequence or flow of effecting an automatic picture position adjustment immediately before displaying a first picture in the picture display apparatus, it becomes possible to [realize] provide a system whereby an operator is [unconscious] not aware of positional deviation of a display picture. --

Please substitute the paragraph beginning at page 12, line 1, with the following.

-- On the other hand, in a case [where] in which there is a large difference between the actual memory writing time and the set memory writing time, e.g., a difference of more than 304 dots exceeding a blanking period for inputted picture signals in an assumed case including [totally] a total of 1328 dots within an interval between subsequent horizontal synchronizing signals and 1024 display dots, the video signal output from the picture display unit drive circuit 2 assumes a form as shown at VIDEO' in Figure 7. In Figure 7, Phr denotes a horizontal picture data output termination, whereas the writing time into the picture memory is deviated by more

than [on] a blanking period, and the picture data outputted from the picture display unit drive circuit 2 beginning from time Phf and ending with time Phr is caused to include a blanking period therein. As a result, while the display position is actually remarkably deviated, the display position data HFC and HRC detected by the display position detection circuit 6 happen to be identical to set timing data of Phf and Phr, thus obstructing an accurate adjustment. --

Please substitute the paragraph beginning at page 12, line 22, and ending on page 13, line 10, with the following.

-- For obviating the above difficulty, a minimum degree within a necessary extent of preset data (e.g., ideal pixel memory writing timing data for each of representative resolution formats such as VGA, SVGA and XGA) are stored in the preset data memory 5, and one of such preset format data is stored in advance in the picture display unit drive circuit 2 after judging the inputted signal format in the display control circuit 4, thereby [by] obviating the occurrence of an extreme positional deviation as shown at VIDEO' in Figure 7. After obviating such an extreme deviation, a minor degree of deviation as shown at VIDEO in Figure 7 is removed by controlling the timing for writing digital data in the pixel memory in the circuit 2 according to the adjustment flow of Figure 4. --

Please substitute the paragraph beginning at page 13, line 20, and ending on page 14, line 21, with the following.

-- Referring to Figure 4, as a first step S1 of display position adjustment, horizontal and vertical display position data HFC, HRC, VFC and VRC are detected by the display position detection circuit 6. Then, at step S2, the set horizontal output commencement time Phf and vertical output commencement time Pvf from the picture display unit drive circuit 2 are compared with actual horizontal output commencement time HFC and vertical output commencement time VFC, respectively, detected by the display position detection circuit 6. As a result of this comparison, if the compared results are unequal, this means that the timing of writing digital data in the picture memory 2m is faster (i.e., too early; on the other hand, in a case [where] in which the time is slower, no positional deviation in display commencement position is recognized as the data is present at the time after reading out of the memory and a prescribed processing of read data), and an operation at step S3 of adjusting a horizontal writing time Mh and a vertical writing time Mv respectively according to the following formulae:

$$Mh = Mhs + [HFC - Phf] \quad \dots (1)$$

$$Mv = Mvs + [VFC - Pvf] \quad \dots (2)$$

wherein Mhs and Mvs denote initial values of horizontal writing and vertical writing, respectively, in the picture memory 2m. If the comparison results at step S2 are equal, an operation at step S4 is performed. --

Please substitute the paragraph beginning at page 14, line 22, and ending on page 15, line 16, with the following.

-- At Step 4, the set horizontal output termination time Phr and vertical output termination time Pvr from the picture display unit drive circuit 2 are compared with actual horizontal output termination time HRC and vertical output termination time VRC, respectively, detected by the display position detection circuit 6. As a result of this comparison, if the compared results are unequal, this means that the timing of writing digital data in the picture memory 2m is slower (i.e., too late; on the other hand, in a case [where] in which the time is faster, no positional deviation in display termination position is recognized as the data is present at the time after reading out of the memory and prescribed processing of read data), and an operator at step S5 of adjusting the horizontal writing time Mh and a vertical writing time Mr respectively according to the following formulae:

$$Mh = Mhs - [Phr-HRC] \quad \dots (3)$$

$$Mv = Mvs - [Pvr-VRC] \quad \dots (4)$$

If the comparison results at step S4 are equal, an operation at step S6 is performed. --

Please substitute the paragraph beginning at page 16, line 2, with the following.

-- By effecting the above display position adjustment sequence just before displaying a first picture [display] after turning on power supply to the picture display apparatus or just before [display] displaying a first picture according to a new picture signal format after converting the previous picture signal format to the new picture signal format, it is possible to [realize] provide a display system wherein an operator is not [conscious] aware of a display picture positional deviation. --

IN THE CLAIMS

1. (Amended) A picture display apparatus for displaying a picture in response to inputted picture signals of an arbitrary format, said apparatus comprising:

a picture display [apparatus] unit having an arranged matrix of dots for picture display[,];

picture display unit drive means for converting inputted picture signals into display picture signals adapted for display on the picture display unit and generating drive timing signals for driving the picture display unit, said picture display unit drive means including a picture memory for storing picture signals inputted into the picture memory;

display position detection means for detecting a picture display position on the picture display unit based on the display picture signals and the drive timing signals[,]; and

display position control means for controlling a timing of admission of the inputted picture signals to the picture memory of said picture display unit drive means, based on the detected display position data from the display position detection means,

wherein said picture display unit, said picture display unit drive means, said display position detection means and said display position control means are integrated to form said picture display apparatus for receiving inputted picture signals of an arbitrary format.

2. (Amended) A picture display apparatus according to Claim 1, wherein said picture display unit drive means [includes a picture memory for storing inputted picture signal admitted

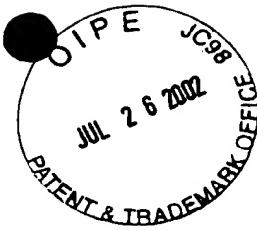
thereto, and] generates a horizontal synchronizing signal, a vertical synchronizing signal and a pixel clock signal as the drive timing signals.

3. (Amended) A picture display apparatus according to Claim 2, wherein said display position detection means detects a horizontal commencement position of a picture displayed on the picture display unit in terms of a number of pixel clock signals from a rise of the horizontal synchronizing signal until first detection of the display picture signals, and detects a horizontal termination position of the picture in terms of a number of the pixel clock signals from the rise of the horizontal synchronizing signal until the termination of the display picture signals, respectively, during one horizontal scanning period, and further detects a vertical commencement position of the picture in terms of a number of horizontal synchronizing signals from a rise of the vertical synchronizing signal until first detection of the display picture signals, and detects a vertical termination position of the picture in terms of a number of horizontal synchronizing signals from the rise of the vertical synchronizing signals until the termination of the display picture signals, respectively, in one vertical scanning period, and

the display position control means controls a timing of admitting the inputted picture signals into the picture memory in the picture display unit drive means, based on a difference between detected position data and set timing data for outputting display picture signals, thereby automatically adjusting a picture display position.

4. (Amended) A picture display apparatus according to Claim 3, wherein said display position control means is further equipped with a preset data memory for storing ideal values for timing of writing in the picture memory, respectively corresponding to a plurality of formats of the [input] inputted picture signals, and [also a] means for judging a format of the inputted picture signals based on an inputted horizontal synchronizing signal and an inputted vertical synchronizing signal accompanying the inputted picture signals and for reading out the ideal value of the judged format of the inputted display picture signals.

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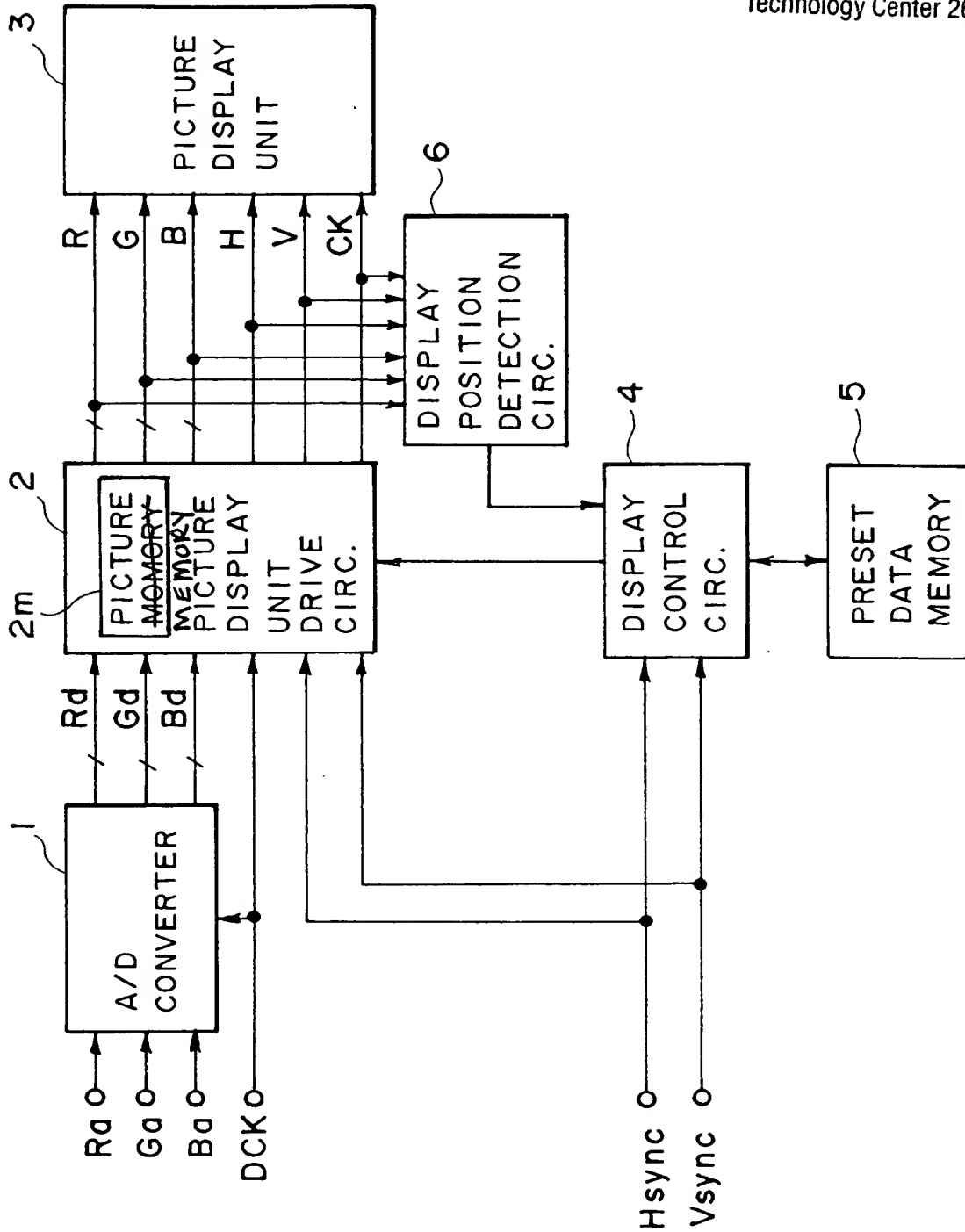


FIG. 1

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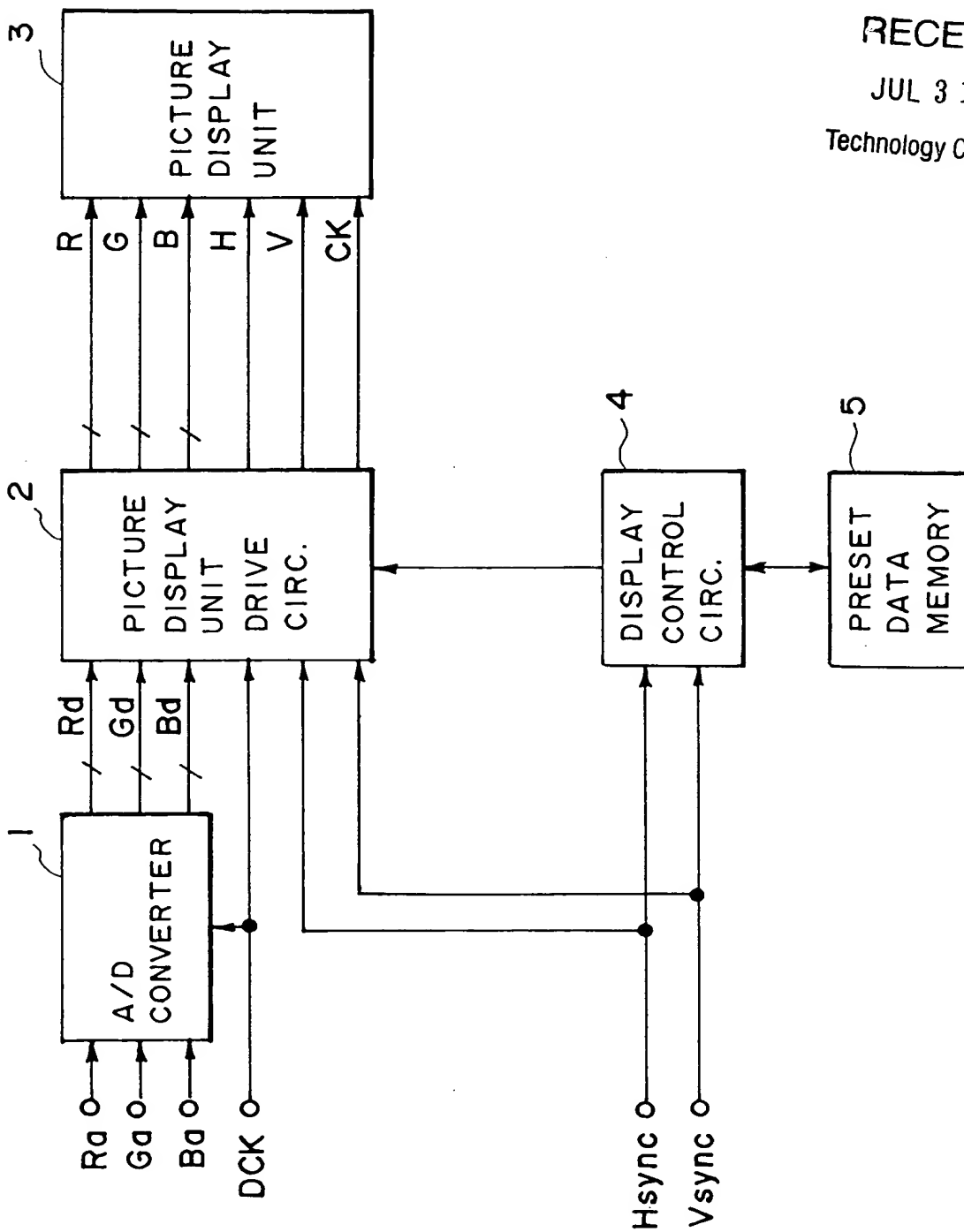


FIG. 5

PRIOR ART

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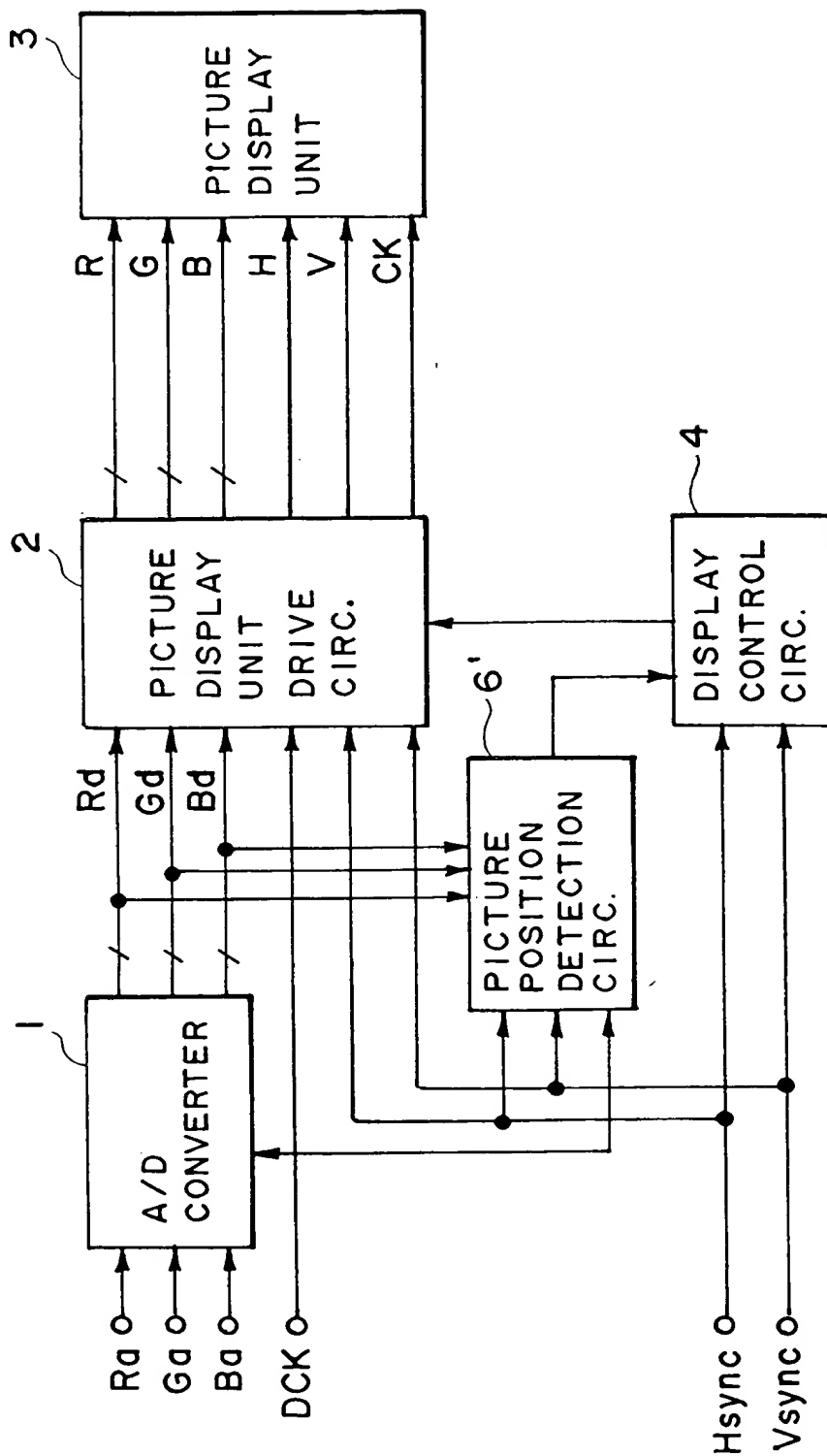


FIG. 6

PRIOR ART

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